



Broward Community College

Course Outline

LAST REVIEW 2008-09 NEXT REVIEW 2013-14 Status: A

Common Course Number: RAT 1111L

Course Title: Radiographic Process Lab

Credit Hours: 1

Contact Hour Breakdown:

Lecture/Discussion 00

Laboratory 32

Other 00

Contact Hours/Week: 2

Catalog Course Description:

Prerequisite: RAT 1001, RAT 1614

Pre or corequisite: RAT 1111, RAT1021c.

Course Description: Provides laboratory experience exposing phantom body parts to radiation to allow therapy students to practice position skills.

Unit Titles:

1. Laboratory Orientation & Safety
2. The Radiographic darkroom
3. Densitometer Measurement
4. Beam Restriction
5. Grid Utilization
6. Screen Fluorescence
7. The Radiographic processor
8. Imaging: Density
9. Imaging: Contrast
10. Imaging: Distortion
11. Imaging: Detail
12. Fluoroscopy

LAST REVIEW Academic Year 2002-2003 **NEXT REVIEW** Academic Year 2007-08

I. Course Overview:

Upon successful completion of this course, the student should be able to operate a radiographic darkroom, perform radiographs utilizing a simulator, utilize grids, intensifying screens, cassettes, and radiographic film, manipulate technical factors to produce radiographs, operate a fluoroscopic tube, and evaluate CT and simulation films for appropriate content and quality.

II. Units:

Unit 1 Laboratory Orientation and Safety

General Outcome:

- 1.0 The student should be able to accurately locate, identify, and manipulate all radiographic equipment and accessories while observing safety precautions in the laboratory.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 1.1 Discuss appropriate general safety precautions to be utilized in the laboratory.
- 1.2 Describe, discuss, and demonstrate radiation protection measures.
- 1.3 Identify and operate the main circuit breakers and power switches.
- 1.4 Identify and operate on the control console: mA, exposure time, kVp, and exposure switch controls.
- 1.5 Warm up the radiographic tube.
- 1.6 Identify and operate the radiographic tube collimator, light localizer, and delineators.
- 1.7 Identify and operate the PSA (patient support assembly) controls.
- 1.8 Locate and identify phantom body parts, cassettes and grids, lead markers, positioning aids and misc. room supplies.

Unit 2 The Radiographic Darkroom

General Outcome:

- 2.0 The student should be able to accurately locate, identify, and manipulate all darkroom equipment and operate a film processor.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 2.1 Describe, discuss, and demonstrate appropriate darkroom safety precautions.
- 2.2 Identify and operate darkroom safelights.
- 2.3 Turn on/off and prepare the automatic film processor for use.
- 2.4 Load and unload cassettes under darkroom conditions using the film bin.
- 2.5 Process x-ray film.

Unit 3 Densitometer Measurement

General Outcome:

- 3.0 The student should be able to accurately identify and utilize a densitometer in the evaluation of radiographs.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 3.1 Explain the functions of a densitometer.
- 3.2 Calibrate a densitometer.
- 3.3 Operate a densitometer by reading radiographic film density.
- 3.4 Experimentally demonstrate the use of a densitometer; experiment A.

Unit 4 Beam Restriction

General Outcome:

- 4.0 The student should be able to accurately explain and demonstrate the effects of beam restriction on scatter radiation and image quality.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 4.1 Adjust radiation field size by utilizing a collimator.

- 4.2 Experimentally demonstrate and evaluate the effects of beam restriction on scatter radiation; experiment B.
- 4.3 Evaluate the effects of beam restriction on image quality.

Unit 5 Grid Utilization

General Outcome:

- 5.0 The student should be able to accurately utilize grids for radiographic procedures.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 5.1 Utilize a grid for simulation radiographs.
- 5.2 Experimentally demonstrate the effects of grid usage on film images: experiment C.
- 5.3 Evaluate grid effects on image quality.

Unit 6 Screen Fluorescence

General Outcome:

- 6.0 The student should be able to accurately expose intensifying screens to x-radiation, in order to identify their phosphor material, differentiate conversion efficiency, and describe the effects of kVp on screen speed.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 6.1 Utilize the simulator to expose intensifying screens.
- 6.2 Experimentally demonstrate screen fluorescence; experiment D.
- 6.3 Evaluate phosphor illumination and identify the type.
- 6.4 Differentiate between the conversion efficiency of screens.
- 6.5 Describe the effects of kVp on screen speed.

Unit 7 The Radiographic Processor

General Outcome:

- 7.0 The student should be able to accurately locate and identify radiographic processor systems and solutions, and troubleshoot common processing problems.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 7.1 Open the automatic processor and locate all internal solution tanks (i.e., developer, fixer, & water wash).
7.2 Review the process of film development by identifying the internal and external processor systems.
7.3 Troubleshoot processing problems by developing radiographs and suggesting solutions.

Unit 8 Imaging: Density

General Outcome:

- 8.0 The student should be able to accurately explain and demonstrate the effects of mA, exposure time, distance (SID), and kVp on radiographic film density.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 8.1 Experimentally demonstrate and evaluate the effects of mA on film density; experiment E.
8.2 Experimentally demonstrate and evaluate the effects of exposure time on film density; experiment F.
8.3 Experimentally demonstrate and evaluate the effects of distance (SID) on film density and utilize the density maintenance formula; experiment G.
8.4 Experimentally demonstrate and evaluate the effects of kVp on film density; experiment H.

Unit 9 Imaging: Contrast

General Outcome:

- 9.0 The student should be able to accurately explain and demonstrate the effects of kVp on radiographic film contrast.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 9.1 Experimentally demonstrate and evaluate the effects of kVp on film contrast; experiment H.
9.2 Experimentally demonstrate and evaluate the effects of mAs and kVp on the scales of contrast; experiment I.
9.3 Utilize the 15% rule to compensate for changes in kVp; experiment I.

Unit 10 Imaging: Distortion

General Outcome:

- 10.0 The student should be able to accurately explain and demonstrate how size distortion affects film detail.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 10.1 Experimentally demonstrate and evaluate how SID affects size distortion and detail; experiment J.
10.2 Experimentally demonstrate and evaluate how OID affects size distortion and detail; experiment K.

Unit 11 Imaging: Detail

General Outcome:

- 11.0 The student should be able to accurately explain and demonstrate the effect shape distortion has on recorded detail.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 11.1 Experimentally demonstrate and evaluate how beam angulation affects shape distortion and film detail; experiment L.

Unit 12 Fluoroscopy

General Outcome:

- 12.0 The student should be able to accurately explain and demonstrate fluoroscopy.

Specific Learning Outcomes:

Upon successful completion of this unit, the student should be able to:

- 12.1 Experimentally demonstrate and evaluate a fluoroscopic procedure; experiment M.